

THURSDAY, APRIL 3, 1890.

TECHNICAL EDUCATION IN THE CODE.

MR. KEKEWICH is to be congratulated on the reception which his Code has hitherto met with. From all sides it has been received with a unanimous chorus of congratulation, tempered only by the difficulty which has been experienced in distinguishing clearly what is new from what is old. Many parts of the Code have in fact been entirely re-cast and re-arranged, and in the absence of the schedule of alterations which it is customary to issue as an appendage to the Code, the compilers of abstracts for the daily papers have this year had a terrible time of it. They have been unable to criticise the alterations without reading the document through, and even this unwonted exercise has not prevented them in more than one case from reproducing as new, old and familiar articles, the order of which has been changed.

But these trials, and the further difficulty of picturing at once the effect on various classes of schools of the action and reaction of numberless modifications, additions, and omissions both small and great, fortunately affect us but little. A great part—some would say the most important part—of the alterations, deal with matters of finance, management, and control, rather than directly with the education given in the schools. And it is with this that we are chiefly concerned in the present article.

So far as regards the changes in curriculum there is no ambiguity. We may fairly congratulate the Government on a solid and unequivocal advance in the right direction. In fact, the framers of the Code have gone a very long way (without the aid of Sir Henry Roscoe's new Bill) to enable elementary school managers to provide technical education, or more strictly to provide the general educational basis on which all specialised technical instruction must be founded.

A few weeks ago, when dealing with the changes in the new Scotch Code, we ventured on two forecasts regarding the coming changes in English elementary schools. The first was that the English Education Office would be unable to maintain its previous *non possumus* attitude on the subject of manual instruction after the Scotch Department had virtually assented to Sir Horace Davey's now famous opinion by including manual training among the grant-earning subjects of the Code. The second was that the policy of the Department would be found to lean (as in Scotland) towards the encouragement and extension of "class subjects," taught throughout the whole school, even at the expense of "specific subjects" which only affect a small minority of picked scholars.

Both these forecasts, as we shall see, have been verified, but this does not by any means exhaust the new provisions by which the range of study, especially of technical and scientific instruction, is extended. We will consider some of the changes in order.

To take first the most striking change, the clause by which manual instruction for the first time is recognized as a part of elementary education will come to many as a

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surprise. It indicates a change of front on the part of the Department on a matter of interpretation of the Education Acts. Hitherto the authorities at Whitehall have declared that the recognition of manual training without a new Act of Parliament was impossible. They asserted that their hands were tied by statute. That was the position a few months ago. And now no statute has been altered, and manual instruction is in the Code. It may be taught either in or off the school premises, and either by the ordinary teachers of the school or by special instructors, provided "special and appropriate provision approved by the inspector is made for such instruction and the times for giving it are entered on the approved timetable." In a later clause manual instruction is specially recognised as an object to which part of the school funds may be devoted.

Thus the aim of the Bill just drafted by the Technical Association is virtually attained without it. One omission, however, may attract notice. No special grants are provided in aid of manual training. In Scotland, it becomes a "class subject," and is paid for accordingly, but no grant is attached to it in the English Code. We presume, however, that there is nothing to prevent it being paid for as a specific subject under the clauses which provide for grants in aid of any subject "if sanctioned by the Department," provided that "a graduated scheme for teaching it be submitted to, and approved by the inspector."¹

There is, however, yet another way in which grants for manual instruction may be made, and, reading between the lines of the Code, it looks not unlikely that the Government mean to adopt it. Drawing is already paid for by the Science and Art Department, and in Art. 85 (b) of the new Code we find drawing and manual training coupled together. Boys in a school for older scholars must be taught drawing "with or without other manual training." Unless, then, the present confusion of overlapping authorities is to be made worse confounded, it is reasonable to expect that both these subjects will be under the same Department, and we shall look with interest for the inclusion of manual instruction in the next Science and Art Directory. There is this further inducement to the Government to take this course, that payments made by the Science and Art Department fall outside the 17s. 6d. limit. In any case, two main conditions should be fulfilled in making grants for manual instruction: first, that they should not be given on results of examination; secondly, that they should be dependent on a really effective inspection. The first condition is necessary because no satisfactory scheme of individual examination in such a subject can be devised so as to be a real test of efficiency; the second is necessary to guard the public purse from being depleted to enable small children to construct bad soap-boxes when they ought to be in school.

But if the official recognition of manual instruction (which we assume includes, as in the Technical Instruction Act, "modelling in wood, clay, and other material"), is the most striking victory of the advocates of technical instruction, there are other changes of greater importance from an educational point of view.

The Department has at last screwed itself up to the

¹ Arts, 16 and 101 (f).

point of refusing to acknowledge any boys' school as efficient which does not include drawing in its curriculum. This is an enormous advance—how great will be seen if we remember that less than a million out of the five million scholars of our elementary schools are receiving instruction in drawing at the present time. It is a great advance, also, on the halting proposal of last year, when the requirement was restricted to large schools which aimed at the maximum grant. When a radical change, such as the present one, is proposed, it is only reasonable that the transition stage should be made easy for schools which have to adapt themselves to the new requirements. We make no complaint, therefore, of the year of grace granted before the regulation comes into force, nor even of the power given to the inspector to dispense with it altogether in cases where the "means of teaching drawing cannot be procured." This provision would, indeed, seriously cripple the usefulness of the change if it were intended to be permanent. But clearly it is only meant to obviate temporary hardships in small schools; and we may congratulate ourselves that within a short space of time, every boy (or at least every boy among the working classes) will be receiving instruction in what is stated by all authorities to be the indispensable basis of almost all technical instruction. As a corollary to the change, there is another of less importance, but of value in its way, which makes drawing an alternative to needlework for boys in infant schools.

While thus the manual instruction of boys is provided for, a useful extension is given to the curriculum for girls, by the provision of a grant for laundry work calculated on much the same principle as that for cookery.

Passing to science teaching, the reforms introduced are no less satisfactory. In the first place, science instruction (as well as manual training) is placed on the same footing as cookery as regards facilities for the grouping of schools for central instruction, and attendance at such centres will count as attendance at school.

A still more important change is the extension of the range of class subjects. Under former Codes a single course of elementary science was sketched out meagrely enough in Schedule II., while managers were invited if they pleased to submit alternative courses to the inspector. The result might have been expected. Science teaching gives in any case more trouble than geography, and the additional necessity of framing their own courses of instruction was quite enough to deter managers from taking up the subject. Now, however, while still giving permission to managers to draw up other courses of instruction, the Department gives a lead by suggesting as examples no fewer than eight different courses in various branches of science, which are embodied in a supplement to Schedule II. The subjects thus treated are mechanics, physiology, botany, agriculture, chemistry, sound, light, and heat, electricity and magnetism, and domestic economy; while the model course still retained in the main schedule embodies a scheme of elementary instruction in "nature knowledge" of a more mixed and varied character.

In each of the first two standards the instruction is to consist of thirty object-lessons in common things, designed to lead on to the more specialised instruction in the third and higher standards, the courses for which follow (perhaps somewhat too closely) the syllabus laid down for

the corresponding subjects in the schedule of specific subjects. It has, of course, been necessary somewhat to simplify and curtail the schemes of instruction in adapting courses framed for picked pupils to suit the capacity of the whole school. It seems to us that the process of simplification might in some cases be carried still further with advantage. Elementary physics for children should consist of a general view of the properties of matter and the forces which act upon it, rather than a more detailed study of one out of many branches of the subject. This was the line taken up by Michael Faraday in his inimitable lectures to children on the "Physical Forces." This too is the view of the Scotch Department, which has laid down a course of class instruction in "Matter," designed to give general preliminary notions of the whole range of physics. And, we may add, this also is the view taken by the Science and Art Department in framing the alternative course in physics for those who (like the vast majority of elementary school children) are not likely to carry their study of physics to a higher stage.

This, however, is a matter of detail, while the suggestion of alternative courses in science, linked to the instruction of the Kindergarten by graduated object-lessons in the first two standards, is a reform which we cannot praise too highly.

Other changes to be noticed are the inclusion among class subjects of history, and the disappearance of the requirement that English grammar should be compulsory as a class subject.

Turning to the schedule of specific subjects, we find less alteration. Mensuration is separated from Euclid and the alternative course of mechanics disappears. There are a few slight changes in the syllabus of the various subjects. Thus the law of conservation of energy drops out of the course on mechanics, presumably because the idea is thought too hard for young children to grasp. But if it be too difficult for *picked* scholars in the fifth and higher standards, how comes it that in the new Scotch Code this very law appears in the syllabus for the "class" subject of "matter" (which we have alluded to above), as part of the course suitable for the whole of Standard IV.? Are Scotch children so very far in advance of English as this difference would seem to imply?

If, however, the fourth schedule presents few changes worthy of note, considerable additions are made to the list of specific subjects for which no special syllabus is suggested, such as book-keeping, shorthand, German, and (in Wales) Welsh. In this way the demand for commercial instruction is met, though how far advantage will be taken of the permission to present scholars in these new subjects remains to be seen. And lastly, payments will be made on account of any other specific subject which the Department may sanction, provided a graduated scheme of instruction be submitted to the inspector.

We have now completed the survey of the purely educational changes of the Code. Henceforth (assuming, as we do, that the provisions of the Code will come into force much in their present form) there can be little complaint on the part of advocates of scientific or technical instruction that its introduction into elementary schools is hindered by the action of the Department. There need be no longer any talk of an educational ladder

with its lower rungs wanting. How far managers will take advantage of their powers remain to be seen. The changes which are compulsory, such as that which makes drawing universal for boys' schools, will, of course, take effect widely at once. Those which are merely permissive may be slow in their operation. Meanwhile, those who are in earnest about the introduction of such subjects as manual training into elementary schools could not better occupy the time which intervenes before the new Code comes into force, at the end of August next, than in perfecting a graduated scheme of instruction such as may be confidently recommended to school managers to submit to the Education Department.

We have laid stress in this article on the proposed changes in the elementary school curriculum, because, important as these are, they are likely to be overshadowed in the coming discussions on the Code by other questions which appeal more directly to party politicians. We have thus left ourselves no room to do more than allude to other reforms which will affect as powerfully the educational character of our schools as the widening of the course of study. After all, the main guarantee of efficiency is the quality of the teaching staff. The new Code raises the requirements of the Department as to minimum staff, improves the regulations regarding the examination and training of pupil teachers, and provides for the creation (on a very limited scale it is true) of day Training Colleges attached to the Universities or Higher Local Colleges, as well as for the attendance of day students at the existing Training Colleges. The Code further revises the system under which the Parliamentary grant is paid, and almost entirely abolishes payment on results of individual examination. It gives freedom to teachers to classify their scholars as they please, so that a child may be in three different standards in the three R's, and in two different standards again in the two class subjects. All these and other changes, which demand much more notice than we can give them, make the Minute of the Department which has just seen the light emphatically a "Teachers' Code."

THE CAVE FAUNA OF NORTH AMERICA.

The Cave Fauna of North America, with Remarks on the Anatomy of the Brain and Origin of the Blind Species. By A. S. Packard. Pp. 1-156, with 27 Plates.

THIS important memoir is the first of vol. iv. of the "Memoirs of the National Academy of Sciences," and contains the results of an examination of the Mammoth Caves in Kentucky made during the months of April and May 1874, and of some other caves in Indiana and Virginia which were visited by the author at a later date.

A description of eighteen caves, with notes on their hydrography and geological age, and an account of the fauna of those which are better known, form the first section of the memoir. The caves form the natural drains of the country, all the surface drainage being at once carried down into them through the innumerable "sink-holes" which pierce the thin stratum overlying the Carboniferous Limestone, in which the caves are excavated. The Mammoth Cave is the largest and best known, with

its 150 miles of passages and avenues, frequently crossing one another at different levels.

Their geological age is uncertain, but there is very little doubt but that they assumed their present proportions long after the melting of the glacial ice and are coæval with the Niagara river-gorge. And as the caves must have been incapable of supporting life while flooded, their preglacial fauna, if they had one, must have been killed off, and they could not have become ready for their present fauna until comparatively recent times; therefore, they must have been colonized by members of the existing fauna. The mode of colonization is very simple. Tracks of bears, wolves, and smaller animals occur in nearly all those caves which are easily accessible from without, and clinging to the skins of these animals various small Arthropods may have been carried in; other species of insects and Myriopods which naturally lead a subterranean life may voluntarily enter the fissures and sink-holes which abound in this region; others, again, get carried in by the agency of torrents which flow in during certain seasons of the year, as, for instance, the eyed fishes and species of Crustacea which abound in the surface waters.

That cave animals have entered the caves from without is further corroborated by the fact that in the case of very many cave species closely allied outdoor species are found in great numbers in the immediate vicinity of the caves. Also caves situated near one another are populated by a similar fauna, which allows us to classify them in groups closely corresponding to the various zoo-geographical regions of the country.

The author then proceeds to the systematic detailed description of the fauna, a section which constitutes more than one-third of the memoir. As in the case of the fauna of the outside world, the species of Arthropoda form a very large percentage of the total number of cave species; but, however different the groups to which the various species belong may be, they possess the common characteristics of slenderness of body and appendages and of the absence of functional eyes. The systematic description is followed by lists of all the North American and European cave species known at present, showing that the European species are by far the most numerous. It is therefore argued that the European caves have been inhabited for a longer period than the American.

Although the animal kingdom, at any rate as far as certain groups are concerned, is comparatively well represented, vegetable life is almost absent, evidently owing to the dryness and the absence of light; in fact, so far as is known at present, it is only represented by a few Fungi and two or three Moulds. The air must also be comparatively free from the germs of bacteria of putrefaction, as the decay of organic refuse is very slow, and meat hung up in the cave will keep a long time. But though bacteria are absent, their office is performed by larvæ of the blind beetle (*Adelops hirtus*) and of flies.

Cave animals are mostly carnivorous. The blind fish (*Amblyopsis*) lives on Crustacea, and especially on the blind crayfish, which in its turn preys upon living *Cæcidotea*, but how they and other small aquatic Crustaceans maintain an existence is unknown. The Myriopods, which are very common, feed on decayed wood and fungous growths.

However, in all cases, as a rule, food must be very